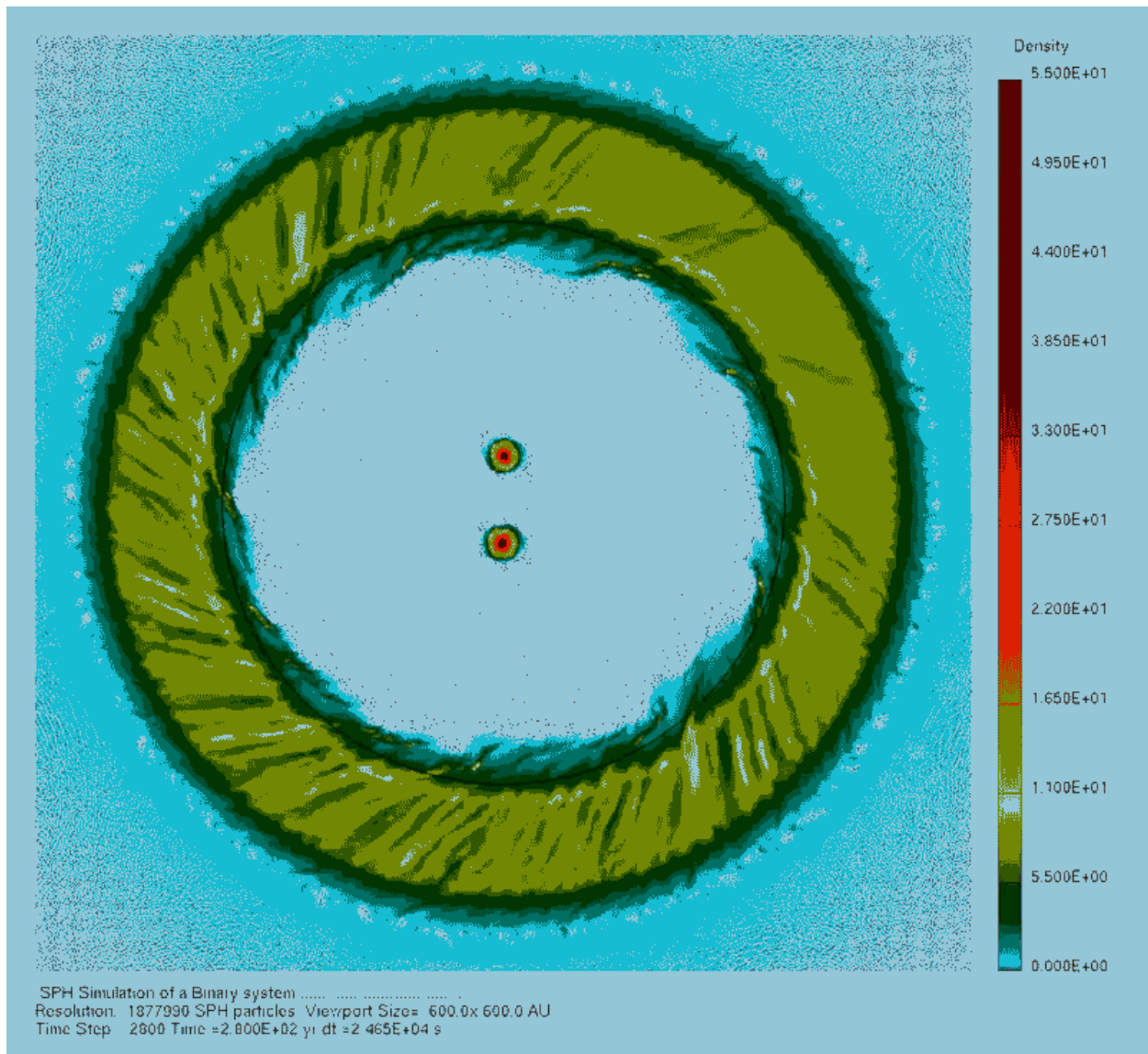


Picture of the Week: Planets unlikely to form around binary stars

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Planets unlikely to form around binary stars

New computer simulations show that although binary star formation takes long enough to allow planets to form too, the environment remains unfavorable due to high temperatures and other conditions.

The simulations use a Smoothed Particle Hydrodynamic code, called VINE, to model a configuration based on the observed "GG Tau A" system, one of the best studied forming multiple star systems in the sky. They include a pair of stars in orbit around each other, with circumstellar disks surrounding each star and a circumbinary torus and disk that orbits the combination.

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"Our simulations show that strong, sharply defined spiral structures are generated in the torus from the stirring action of the binary and that parts of these structures fall onto the circumstellar disks," said Andy Nelson of the Computational Physics Division at Los Alamos National Laboratory. "That material then migrates quickly through the disks and falls onto the stars. The balance between the rate at which material enters the disks and the rate it leaves and falls onto the stars means that the gas currently in the circumstellar disks has only been there for a few thousand years. That is too fast for planets to form efficiently."

On the other hand, he says, "The torus around GG Tau A is massive and strongly self gravitating. Its influence on the binary is slowly pushing the stars closer to each other, and the spiral structures growing within it may fragment into another small star or a brown dwarf at some time in the future. GG Tau A is not done surprising us, so check back in a million years or so!"

The simulations were performed by Nelson and Francesco Marzari of the University of Padua, Italy. The findings were published in the August 2016 volume of the Astrophysical Journal and highlighted in the American Astronomical Society (AAS) Nova.

<http://aasnova.org/2016/08/15/models-of-a-circumbinary-disk/>

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